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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,377	12/23/2004	George Cullen	KNN-017	4662

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KIRKPATRICK & LOCKHART NICHOLSON GRAHAM LLP  
STATE STREET FINANCIAL CENTER  
ONE LINCOLN STREET  
BOSTON, MA 02111-2950

EXAMINER
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TSAI, CAROL S W

ART UNIT	PAPER NUMBER
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2857

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/501,377

Applicant(s)

CULLEN ET AL.

Examiner

Carol S. Tsai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 10-27, and 29-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-13 is/are allowed.
- 6) ☒ Claim(s) 1-7, 15-27 and 29-40 is/are rejected.
- 7) ☒ Claim(s) 8 and 28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Drawings***

2. The drawings were received on September 19, 2006. These drawings are accepted by the Examiner.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4, 7, 15, 16, 18-20, 22-27, and 29-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,434,509 to Blades in view of U. S. Patent No. 6,138,078 to Canada et al.

With respect to claims 1, 15, 29, and 36, Blades discloses an electric motor monitoring system comprising an antenna (antenna 99 shown on Fig. 8) and a processor (microprocessor 92 shown on Fig. 8); the antenna detecting a radio-frequency signal generated by arcing events in the electric motor (see col. 18, lines 50-51 and col. 21, 18-31).

Blades does not disclose processing the radio-frequency signals to determine one or more operational parameters of the electric motor.

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Canada et al. teach processing the radio-frequency signals to determine one or more operational parameters of the electric motor (see Fig. 9 and col. 2, lines 47-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify 's method to include processing the radio-frequency signals to determine one or more operational parameters of the electric motor, as taught by Canada et al., in order that operational parameters of the electric motor can be determined by the processor via a Radio-frequency (RF) data link.

As to claim 2, Blades also discloses a means for screening background noise so improving the overall signal to noise ratio of the electric motor monitoring system (see col. 11, lines 15-28).

As to claims 3, 4, and 27, Blades also discloses a frequency matching unit such that the frequency matching unit allows the antenna to be frequency tuned so as to optimize its operation with the electric motor (see col. 21, lines 18-42).

As to claim 4, Blades also discloses a signal conditioning unit (see col. 6, lines 6-10 and col. 11, lines 15-21).

As to claim 7, Blades also discloses an electric field probe or a magnetic field probe (see col. 26, line 54 to col. 27, line 1).

As to claims 16 and 18, Blades also discloses associating the frequency of the radio frequency signal to individual components of the electric motor (see col. 21, lines 17-26).

As to claims 19 and 34, Blades does not disclose Fast Fourier Transformations so as to convert the sampled data to interpretable frequency spectra.

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Canada et al. teach Fast Fourier Transformations so as to convert the sampled data to interpretable frequency spectra (see col. 1-5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Blades's method to include Fast Fourier Transformations so as to convert the sampled data to interpretable frequency spectra, as taught by Canada et al., in order to allow the frequency components to be identified.

As to claim 20, Blades also discloses the application of Digital Signal Processing techniques to the sampled data so as to convert the sampled data to interpretable frequency spectra (see col. 7, lines 11-15).

As to claims 22, 23, 30, 32, 37, and 39, Blades also discloses frequency features that can be directly associated with one or more components of the electric motor (see col. 22, lines 28-40).

As to claims 24-26, Blades also discloses calculating an average width of the radio frequency signals, above a predetermined level, over a number of arcing events (see col. 21, lines 18-42).

As to claim 27, Blades also discloses the additional step of self-calibration of the method (see col. 4, lines 12-18).

As to claims 31 and 38, Blades also discloses determining a physical location within the electric motor according to the arcing events (see col. 2, lines 53-61).

As to claims 33 and 40, Blades does not disclose determining variations in the operational parameters of the electric motor.

Canada et al. teach determining variations in the operational parameters of the electric

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motor (see col. 13, lines 30-44).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Blades's method to include determining variations in the operational parameters of the electric motor, as taught by Canada et al., in order that machine operating parameters such as vibration (radial, horizontal, vertical, and other variations), temperature, flux, and the like, being preferably tethered to the monitor 100 by cables can be sensed and determined.

As to claim 35, Blades also disclose manipulating and storing data corresponding to the radio-frequency signals (see col. 23, lines 47-52).

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blades in view of Canada et al. as applied to claim 1 above, and further in view of DE003140319A1 to Lindsay et al.

As noted above, as to claims 5 and 6, Blades in combination with Canada et al. disclose the claimed invention, except for a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna.

Lindsay et al. teaches a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna (see Abstract, lines 1-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Blades in combination with Canada et al.'s system to include a balanced Faraday screened loop antenna/an unbalanced Faraday screened loop antenna, as taught by Lindsay et al., in order that when the alternating magnetic field amplitude is constant, the

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output signal of the antenna is free of resonances over a wide range, virtually independently of the frequency.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blades in view of Canada et al. as applied to claim 15 above, and further in view of U. S. Patent No. 5,737,026 to Lu et al.

As noted above, Blades in combination with Canada et al. disclose the claimed invention, except for the detection of the high frequency signals employing a non-intrusive antenna.

Lu et al. teach the detection of the radio frequency signals employing a non-intrusive antenna (see col. 12, lines 4-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Blades in combination with Canada et al.'s method to include the detection of the radio frequency signals employing a non-intrusive antenna, as taught by Lu et al., in order to pick up the video signal radiated by the rear end of a television set's picture tube.

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blades in view of Canada et al. as applied to claims 15 and 20 above, and further in view of U. S. Patent No. 6,701,274 to Eryurek et al.

As noted above, Blades in combination with Canada et al. disclose the claimed invention, except for Wavelet Analysis.

Eryurek et al. teach Wavelet Analysis (see col. 3, line 50 to col. 4, line 19).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Blades in combination with Canada et al.'s method to include

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Wavelet Analysis, as taught by Eryurek et al., in order to allow the frequency components to be identified.

*Allowable Subject Matter*

8. Claims 8 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 10-13 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter:

U. S. Patent No. 5,434,509 to Blades in view of U. S. Patent No. 4,999,641 to Cordery et al. are references closest to the claimed invention. Blades in combination with Cordery et al. disclose an antenna for measuring high frequency radio frequency signals associated with arcing events from a brush contact in an electric motor, the antenna comprising a loop and a loop screen, and the loop screen shields the loop from background noise thus improving the signal to noise ratio of the signal detected by the antenna. However, Blades in combination with Cordery et al. do not teach the loop comprising a conductor and a screened coaxial cable such that the conductor is turned back on itself so as to form one or more turns while the end of the conductor cable is attached to the screen of the coaxial cable; and including all of the other limitations in the respective independent claims.



*Response to Arguments*

11. Applicant's arguments with respect to claims 1-7, 10-13, and 15-40 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

*Contact Information*


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. W. Tsai whose telephone number is (571) 272-2224. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571) 272-2216. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 886-217-9197 (toll-free).

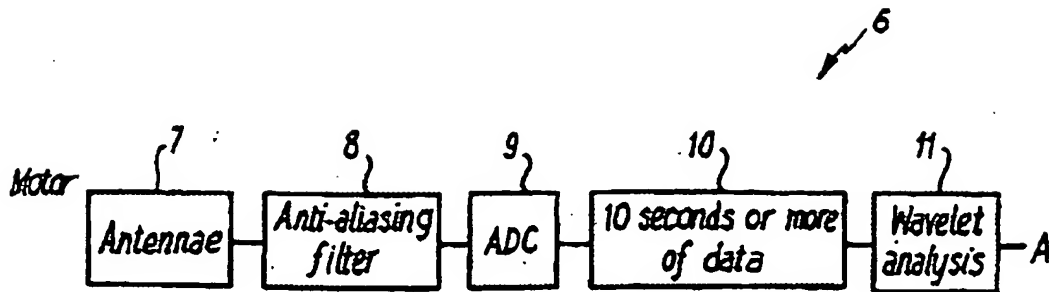
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October 28, 2006  
Art Unit 2857

  
CAROL S.W. TSAI  
PRIMARY EXAMINER

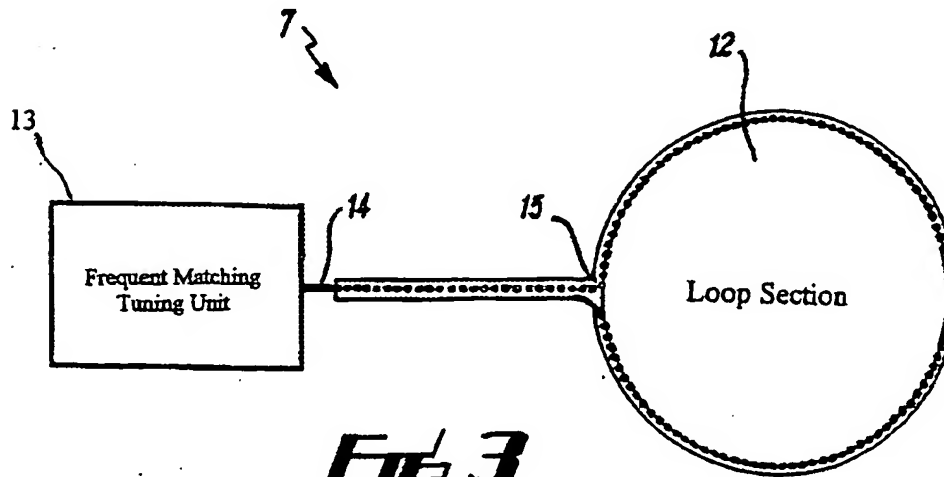


*Approved*  
*CS*  
*10/28/06*

Title: Electric Motor Monitoring System  
Applicant: Cullen *et al.*  
U.S. Serial No. 10/501,377  
Atty Docket No. KNN-017  
Atty/Agent: James E. Fajkowski  
Express Mail Mailing Label No. EV899584531US  
Replacement Sheet 2/5



**FIG. 2**



**FIG. 3**